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PAPERS
IN
MECHANICS.

No. I.

INSTRUMENT FOR THE USE OF BOOT AND
SHOE MAKERS.

TWO SILVER VULCAN MEDALS were presented, one to Mr. JAMES DOWIE, and the other to Mr. ALEX. BLACK, both of Edinburgh, for their Instrument for the use of Boot and Shoe Makers, one of which has been placed in the Society's Repository.

SIR,
4, Register Street, St. Andrew Square,
Edinburgh, 8th January, 1828.

WE have the honour to enclose for the consideration of the Society of Arts, a notice regarding an apparatus for the use of boot and shoe makers; and also *four* certificates from masters in the trade, who have had those in use which were formerly invented, and *three* of whom now use the kind which is herewith sent; *eight* from other masters, who have had opportunities of judging of its usefulness, *two* of them having used them; and *twelve*

from workmen, who have had like opportunity, some of them having wrought and are still working with them.

We are, Sir,
&c. &c. &c.

JAMES DOWIE,
Boot Maker.

A. AIKIN, *Esq.*
Secretary, &c. &c.

ALEX. BLACK,
Surveyor.

The posture in which boot and shoe makers usually work has long been known to be injurious to their health, and has led to the invention of various plans for executing their work in a more favourable position; none of these, however, have been generally adopted, owing to their not fully answering the intended purpose, and also from circumstances connected with the trade itself.

I shall as briefly as possible state a few facts illustrative of what I mention: first, it is known to medical men that the workmen are in general liable to indigestion, gravel, piles, and other analogous diseases, arising in a great degree from the constrained postures in which they work.

The mode the workman adopts when sitting is as follows:—The boot-closer executes his branch by the assistance of an implement styled a pair of clams, which is merely two pieces of staves, about two feet six inches long by three or four inches broad, fixed on a block at the under end, in the form of a triangle, and sometimes in the form of an ellipse. The work is put in at the top, and is held in the clams by the pressure of the knees of

the workman. Another part of this branch is done on a block of wood on the left knee, steadied there by means of a strap passing under the sole of the foot, and over the block on which the work is placed.

The workmen, when making either shoes or feet of boots, generally use the same sort of strap, but sometimes hold the shoe between the left knee and the chest, causing these two parts to answer the purpose of a vice; and also often hold the work between the knees, the thighs serving for a support while hammering it and finishing. The hard leather is prepared by being hammered on a stone or smooth iron laid on the thighs of the workman.

A want has always been felt of some apparatus by which the boot or shoe might be kept firm in any required position, without constraining the workman to adopt postures so inimical to his health as he is obliged to assume in the ordinary mode of working.

Among the first inventions for this purpose (that I know of) was one by Mr. Holden, of Fettleworth. His method was to keep the boot or shoe on a cushion, in order to allow the workman to sew it; but, from the description, it does not appear capable of admitting the workman to perform other operations, such as hammering and finishing, at least with ease to himself or safety to the machine; and it is incomplete for want of a proper closing apparatus.

The next is that of a Mr. Parker, and is described by Mr. Smith, in his *Compendium of Practical Inventions*, as "consisting of a bench standing on four legs, the top of it being about four feet from the ground; a circular (or rather annular) cushion, in diameter at least equal to the length of the shoe, is placed on the

bench. Through the centre of the cushion, and through the bench, is a hole to admit a strap, which being brought double through the hole, forms on the top of the cushion a loop to admit the shoe containing the last : when, therefore, the lower ends of the strap are fastened to a board on the floor, like the treadle of a foot-lathe, the workman pressing upon this board, holds the shoe sufficiently tight upon the cushion to proceed with his work ; and by taking off the pressure of his foot, the shoe can be turned or taken off. The cost is estimated at two guineas." This one, however, requires the workman always to stand, in order to press down the treadle with his foot, and is, therefore, unnecessarily fatiguing. In this, as well as the other, there is no contrivance for closing.

There is another by a Mr. Johnston, somewhat similar to the last one described : they differ in this, however, that the cushion of the latter is an oblong block of wood, rising on each side, like the two thighs of the workman ; a strap passes through it as in the other, but instead of being fixed to a foot-board, it is attached to a spring, which allows the workman to stand free, or sit on a high seat. The disadvantage attending it is, the strength of spring to keep the shoe firm is such that the workman cannot adjust his work quickly. There seems to have been a kind of clams attached to it, which partake of the same inconvenience.

A Mr. Stass invented a form of clams with a joint like that of pliers, and a strap attached to each end of the lower part, and fixed to a treadle. All which, from the workman being obliged to stand in order to press down this treadle, rendered it as difficult as when sitting in his former condition ; the only advantage being that of having his body in a more upright posture.

The plan now offered to the consideration of the Society of Arts is intended to obviate these difficulties.

I have been assisted in bringing the apparatus to its present convenient form by Mr. Alexander Black, surveyor; we have, in conjunction, endeavoured to arrange it so as to adapt it to all the purposes of the workmen; and to avoid the defects of the usual methods, and of those which appeared to us to exist in the other plans mentioned above.

I have had several of the machines in use by my men since the end of the year 1824, and feel warranted by experience in saying, that they answer perfectly, both in affording facility and despatch, and in improving the situation of the workmen in regard to health; while no trouble has been found in its adoption by men who had been accustomed to work in the old way.

The model which accompanies this may be considered as of a proper average size, it being of the same dimensions as those at present in use here; it may vary in its height according to that of the workman.

The frame consists of four legs, a bottom, and top, with rails for the reception of the arbor of the wheel and axle. There are also a pair of clams, a block for flat seam, and a circular block stuffed and covered with leather; all of which are occasionally placed on the top of the frame as they may be required.

There is a weight of about seventeen pounds attached by a strap of leather to the wheel. The paddle for easing the work is attached to the axle by a strap, and slides on brass friction plates placed on one of the legs. The circular block and small cushion serve as a bed for the shoe to lie on during every part of the operation, except in closing, and are kept firm by a strap from the axle

passing up from it through a hole in the top of the frame.

The form of the clams is, I believe, new, and is very convenient, as the work to be held in them is adjusted by the operation of the paddle, and is connected to the power on the axle by means of a fixed strap and hook to a swivel on the former strap. The block for flat seam is held by the same means as the shoe.

It may be noticed, that the closing apparatus is well adapted to the use of saddlers and harness-makers.

One cause of the plans formerly proposed not being adopted arose, as I have stated, from circumstances connected with the trade itself, and will apply to this invention as well as to them. This cause, I humbly think, may be obviated, with immediate advantage both to masters and workmen. The men at present work chiefly in their own houses, which are thus rendered inconvenient to their families, as they seldom or never have a separate room to work in; and the masters have not the advantage of the immediate superintendence of their workmen, they being all scattered in different parts of the town.

Now this could be obviated, in my opinion, with little expense, and a great deal of comfort secured to the workmen, as well as convenience to the masters, if the latter were to provide workshops for their men, furnished with these benches, according to the number of hands they employ. In such an arrangement, the master would have it in his power to inspect his work at once, and see his materials properly manufactured, according to his own directions, without the necessity of having to go through all his different workmen's houses. There would also be a stimulus to the workmen to improve in their work, as

well as many other advantages. One of these, in my opinion, would be to lead the men to great habits of sobriety and industry; and I am borne out in my opinion by conversations which I have frequently had both with masters and workmen.

When it is considered that the trade of shoe-making is practised in almost every country, and that the workmen form a considerable portion of every community, it is hoped that any plan conducing to the improvement of the habits and health of such a numerous class will not be deemed unworthy of the attention of a Society which does so much for the promotion of the useful arts and for the welfare of the working classes.

Reference to the Drawing of Mr. DOWIE's Shoe-making Machine, one-eighth of the real size. Plate VII.

Figs. 1 and 2. Front and side views. It consists of four bars *a a a a*, framed together at top by bars *b*, and into a block *c* at bottom; three sides are closed with thin boards *d d d*, and the fourth by the door *e e*, which hides the inside, and makes it appear like a square post; in fig. 2 the side board is removed; *f f*, two holes through which studs *g*, fig. 1, fixed in the board, pass; fig. 3, a pin which is passed through their eyes to keep the board in its place, it being stepped into the bottom block; *h h*, fig. 1, the two hinges of the door *e*, it being removed; *i*, a block fixed on the top, having a round hole through the middle, and a circular recess, *j j*, shewn by dotted lines; on this lies the cushion-block *k*, also perforated, and having a circular projection, which goes into the recess *j*, and keeps it central: this cushion is the substitute for the lap; on it the work is held by

the strap ll , which is connected to a strap m by two swivel links nn ; these allow the work to be turned about any way without twisting the strap n , which is fixed to a small barrel o ; p , a larger strap wheel on the same axis; q , the strap which is fixed at r , and supports the weight s . The wheel p is three times as large as o , and, therefore, the weight s holds the work three times as tight as its own weight; t , another small barrel also on the same axis, having a strap uu fixed to it, this is buckled to a sliding pedal vv ; ww , the slit in which it moves: x , a flat part of the pedal which rubs against the brass plates yy ; z , a similar piece rubbing against inside plates; a gap is also made in the board d for the pedal to move in. By treading on this pedal, the weight s is raised and the work released; and on removing the foot the work is held tight.

Fig. 4, the closing vice. Fig. 5, a top view of it opened: a , the two hinges; b , the jaws; in the centre hole there is a screw c , from which hangs a strap d , having a hook at bottom. Fig. 6, a side view of the strap; when this is used, the cushion-block k is removed, and the strap l allowed to hang down from the swivel n ; the closer is then put on it, having a projection j to enter the recess, and the strap d is hooked to the swivel; the weight s then keeps its jaws tight, yet they may be pulled open by the hands, or released by the pedal v . The dotted lines, fig. 4, shew the action of opening; when the two corners e rest on the block i , the weight s , acting on the strap d , pulls the middle part down to close the jaws. Figs. 7, 8, side and end view of a block to be held down by the strap l on the top i . Figs. 9 and 10, side and end views of a soft pad or cushion. Fig. 11, a top view of the cushion-block k .

CERTIFICATES.

*Edinburgh, 14, South College Street,
11th December, 1827.*

We hereby certify that the machine for the use of boot and shoe-makers, by the model of Mr. Parker, was in use by us, but found it did not answer so well as the model by Messrs. Dowie and Black, and which is in use by us at present; and we think it would be a very valuable acquisition to the trade if it was become a general system.

ANDREW DEWAR,
ALEX. C. DEWAR,
JOHN DEWAR.

Edinburgh, 5th January, 1828.

I have minutely examined the machine recently invented by Mr. James Dowie and Mr. Alexander Black, of this city. The object of this invention is, to combine an improved attitude or position of the shoe-maker's body when employed at work, with every requisite perfection in the quality of the workmanship produced; and my decided opinion is, that, by means of the present machine, this desirable end is very successfully accomplished. In the improved state to which the invention is now brought, it is applicable to all the different branches of boot and shoe-making, in all the varieties and particular parts of the same, while the position of the body is manifestly improved: my opinion is, that, in all the departments of the trade, the use of this machine equals, and in most of them excels, the usual mode of operation practised by the craft.

JAMES DOW, *Boot and Shoe Maker.*

GENTLEMEN, *Edinburgh, 4, William Street,
7th January, 1828.*

I do hereby certify that I have wrought at my trade of boot and shoe-making, for the space of twelve months, on the machine invented by Messrs. Dowie and Black, and find it in every way extraordinarily convenient for the completion of every branch of the trade; and I think that it would be advantageous to the health of the craftsmen if it were in general use.

JOHN TOLMIE.

GENTLEMEN, *December 27th, 1827.*

I do hereby certify that the machine invented by Messrs. Alexander Black, surveyor, and James Dowie, boot-maker, Edinburgh, is completely calculated to perform all the different parts of boot and shoe-making, having wrought at one of them for upwards of two years.

JOHN ANDERSON.

SIR, *Edinburgh, 5th January, 1828.*

I have examined your machine for improving the mode in which shoe-makers sit at their work. The present method of working is extremely uncomfortable, from the stooping posture in which they are obliged to sit, and, at the same time, very injurious to health, from the pressure of their work upon the breast. In your machine all these disadvantages are remedied, as the workman may either sit or stand upright, and perform all the parts of boot or shoe-making with the greatest facility and comfort.

Some years ago I attempted to work with a machine

intended for the same purpose as yours ; but from some defects in its construction, it did not answer to my wish, and therefore I laid it aside. But I find all its deficiencies remedied in your machine ; and have no doubt that when it comes into general use, it will be found of the greatest utility to the trade.

I am, Sir, &c. &c.

JAMES DOWIE, Boot Maker,
4, West Register Street.

J. WALLACE.

No. II.

FLOATING BRIDGE.

The LARGE SILVER MEDAL was presented to H. W. HOOD, Esq., Commander of His Majesty's Ship Hyperion, for a Floating Bridge ; a Model of which has been placed in the Society's Repository.

His Majesty's Ship Hyperion, Newhaven,

SIR,

March 3, 1828.

THE Floating Bridge, which the accompanying plan and elevation represents, was constructed under the following circumstances ; and has been in use, as the means of communication between His Majesty's ship Hyperion and the eastern boundary of Newhaven harbour, for two years.

The bed of the harbour in which the ship lies is about twenty feet below the base of the wall or river